



**United States
Department of
Agriculture**

**Grain Inspection,
Packers and Stockyards
Administration**

**Federal Grain
Inspection
Service**

Washington, D.C.

Mechanical Sampling Systems Handbook

Reserved

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Chapter 1

GENERAL INFORMATION

1.1 PURPOSE.

This handbook sets forth the policies and procedures regarding the equipment requirements, installation, authorization, examination, and testing of mechanical sampling systems.

1.2 POLICY.

Mechanical sampling systems used for official purposes must be examined, tested, approved, and authorized in accordance with the procedures stated in this handbook.

Mechanical sampling systems are composed of one or more automatic sampling devices powered either pneumatically, electrically, or hydraulically. These systems can draw representative samples of commodities in a variety of applications. To ensure the accuracy and integrity of official inspections, mechanical sampling systems used for official sampling purposes, including obtaining warehouseman's sample-lot inspection samples, shall meet the following criteria:

- a. The major components of the system must be of a model and type approved by FGIS.
- b. Installation of the official sampling system must be authorized by FGIS.
- c. The system must be maintained and, if necessary, repaired or altered in accordance with established procedures.
- d. At the prescribed intervals and after any alterations, the system must be tested and examined in the correct manner and found within established tolerances.
- e. The system must be operated according to the instructions when in use for obtaining official samples.

1.3 AUTHORITIES.

This handbook is issued pursuant to Section 16(a) of the United States Grain Standards Act, as amended; and the Agricultural Marketing Act of 1946, as amended.

1.4 DEFINITIONS.

- a. Alteration—Modifications, or any changes from when the sampling system was last tested and authorized. These include changes to the sampler position, parts, speed, wiring, dust collection, etc. It also includes changes to the grain handling system that affect the sampler, such as: increase in grain flow, change in belt speed, use of new shipping bins, etc.
- b. Authorization—The FGIS field office manager authorizes use of the mechanical sampler by signing a Form FGIS-980, "Authorization to Use Mechanical Sampler for Sampling." Without this authorization, the sampler may not be used officially.
- c. Cancellation—The current authorization is permanently withdrawn (revoked). If the facility wishes to obtain a new authorization, they must start all over, as if it were a new installation, by submitting a letter and drawings. An examination and test with five lots of grain will be required.
- d. Commodities—As used throughout this handbook, means grain, rice, beans, peas, lentils, and processed grain products.
- e. Controls.
 - (1) Auxiliary Controls—Any device that either duplicates or bypasses the operating controls. Also an override, a delay switch, dump counter, or a programmable controller that may interrupt your exclusive use of the sampling device.
 - (2) Operating Controls—Used by the sampling attendant for normal operation of the sampling system. The control panel includes an on/off switch, timer, indicator lights, and other switches controlling excess sample return, pneumatic sample delivery, etc.
 - (3) Lockout Controls—A *lockout switch* is a device that will disconnect the main power supply and bring the D/T sampler to a zero energy state. The lockout switch is the only override both required and allowed.
- f. Examination—An examination of the sampler is done by official personnel using the Form FGIS-936, "Sampler Condition Report," as a checklist and record. It is

a visual check that requires opening the inspection plate and examining the sampler condition and operation.

- (1) Initial—The first examination, before the sampler can be used officially.
 - (2) Periodic—On a regular schedule, such as every 6 months.
 - (3) Supplemental—Extra examinations required after repairs or anytime there are accuracy questions.
- g. Monthly Sampler Checks—These checks are done at export port locations by official personnel. Results are kept in a log book—a Form FGIS-936 is not required.
- h. Primary Sampler—The main sampler, normally a diverter-type sampler.
- i. Secondary Sampler—A powered divider to reduce or split the sample obtained by the primary sampler, while maintaining its representativeness. Sometimes a Boerner cargo divider may be used.
- j. Suspension—A letter from the field office to temporarily withdraw the authorization. Records are kept on file, so the sampler can be easily reauthorized if requested. Suspension of the authorization can also be the first step in permanent cancellation of the authorization. A formal suspension is not always required if the sampler problems can be corrected immediately or before the sampler is used officially.
- k. Test—A test or checktest is done by an inspector using either five lots or one lot of grain. Initial, Supplemental, and Periodic have the same meanings as in item f., when they are used to describe a test.

Reserved

Chapter 2

SPECIFICATIONS

2.1 DIVERTER-TYPE MECHANICAL SAMPLERS.

a. General Requirements.

- (1) The design, construction, and location of samplers and related equipment must suit the intended official use of the sampling system.
- (2) FGIS must approve the model and type of primary (Figure 1) and secondary sampler used in the system.
- (3) The FGIS field office manager must authorize the system for official use based on the examinations and tests specified in Chapters 4 and 5.
- (4) Official personnel shall maintain accurate and up-to-date documentation and drawings (in their official files) on system design, installation, and approved modifications.
- (5) The sampling system must be accessible for full and safe inspection.

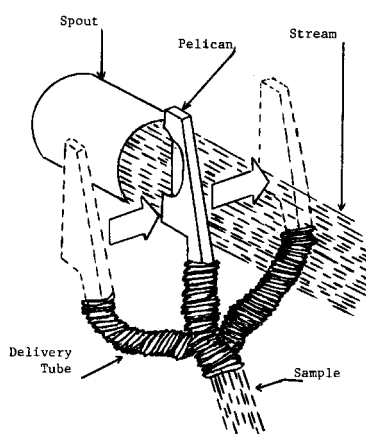


Figure 1. Diverter-Type Sampler

b. Equipment Requirements.

- (1) Overall dimensions of the primary sampler must be adequate for the volume and velocity of the commodities to be sampled. Primary samplers must allow:
 - (a) All of the commodity presented for sampling to be accepted by the pelican as the pelican passes through the stream, and
 - (b) Delivery of all of the sampled commodity to the secondary sampler.
- (2) The design, construction, materials, and quality of the equipment must be such that it can withstand normal use without loss of accuracy or reliability. Under normal operating conditions, operating parts will remain fully operable and adjustments will remain reasonably constant.
- (3) The primary and secondary mechanical samplers shall be permanently marked to show their manufacturer, model designation, and serial number. Facility management must arrange for the manufacturer to supply new I.D. plates for old, unmarked samplers.
- (4) The pelican (See Figure 1.) must traverse at an even speed, as close as possible to ½ meter (20 inches) per second.
- (5) Power sources, valves, and switches must conform with the following requirements:
 - (a) Air supply for air-operated primary samplers must be uniform and maintain specified operating pressure. If scale operations or other air uses cause a loss of effective working pressure, a separate air supply system must be installed.
 - (b) Maintain constant line voltage to ensure correct operation of electrically-operated primary and secondary samplers.
 - (c) Valves, switches, solenoids, cylinders, motors, or other activating or operating mechanisms must be high quality, positive action

devices that meet all OSHA and FGIS safety requirements and appropriate local codes.

- (6) Controls.
 - (a) Controls must be under the direct supervision of the assigned official inspection personnel or warehouseman sampler. Also, any auxiliary controls must be under their exclusive control. A lockout switch is not considered an auxiliary control. Refer to Page 2-7 for information on lockout switches.
 - (b) Controls for mechanical samplers and related sample handling systems, including but not limited to push buttons and switches, shall be conspicuously identified as to the equipment or activity controlled by the push button or switch.
- (7) A sealable or lockable inspection plate must be installed on each primary and secondary sampler to allow quick and easy examination of all moving parts. Plates should be positioned to allow viewing the entire length, and directly into the pelican opening. They should allow complete viewing of the dust seals.
- (8) Older, previously approved sampler installations must have inspection plates upgraded to meet the above requirement when repairs or major maintenance are done.
- (9) Access to the inspection plates must be free of hazards.
- (10) Inspection plates are not required on rotary-type secondary samplers constructed of cast metal. This does not eliminate the need to open and examine the secondaries during a condition examination.
- (11) Secondary samplers used for reducing the size of samples obtained by the primary sampler must be appropriate for the type of facility in which they are installed:
 - (a) Facilities with a maximum flow rate of less than 10,000 bushels per hour (passing the sampling site either through a spout or carried on a belt) may use a powered secondary sampler or a cargo-type divider. For cargo-types, sample feed must be directed to the

center of the divider. If it plugs, clogs, or creates other problems, it must be replaced with a powered secondary sampler.

- (b) Facilities with a maximum flow rate of 10,000 bushels per hour or more (passing the sampling site either through a spout or carried on a belt) must use a powered secondary sampler.
- (12) The entire diverter pelican opening must be at least $\frac{3}{4}$ inch (1.9 cm) but less than $\frac{7}{8}$ inch (2.2 cm) wide. If required for structural strength, the manufacturer (or owner, if according to the manufacturer's drawings) may install small braces in the pelican opening.
- (13) Secondary samplers must be large enough to reduce the quantity of sample delivered by the primary sampler without backing up. All secondary samplers, including those that use adjustable slot openings (ratio adjustment plate), must be set so the slots are not narrower than $\frac{3}{4}$ inch (1.9 cm). Any slot adjustment plates must be secured or sealed in position for testing and use.
- (14) Sample return mechanisms should be designed to return excess sample to the lot from which taken.
- (15) Sample delivery tubing, flexible or rigid, must be physically secured (clamps, sealants, security seals, etc.) at all junctions that would allow the representativeness of the sample to be easily altered by adding or removing material.
- (16) Air intake vents on pneumatic delivery systems must have a suitable screen or cover sealed or fixed in place to prevent the introduction of material into the official sample.
- (17) All sampler inspection plates, operating controls, timers, air intake vents, and sample collection boxes must be secured, locked, or sealed closed when they are not located in the official inspection laboratory and/or are not continuously attended by official inspection personnel or the warehouseman sampler.
- (18) If the primary sampler (or other) seals need to be broken by the facility for maintenance or unofficial use, notice (before) or explanation (after) must be given to official inspection personnel. The official personnel must physically examine the affected area and if satisfied that the integrity of the system is not compromised, all broken seals must be replaced. If notice or suitable explanation is not given and seals are found broken, the system

must be reexamined (condition examination). The testing office may also require testing using five lots of grain.

- (19) When application of security seals to a primary or secondary sampler will not provide an increased level of security, they are not required. For example, where access through the belt opening in the sampler hood cannot be eliminated (belt-end diverter sampler).
- (20) The entire sampling system must be self-cleaning to prevent contamination of a commodity from one lot to another.

c. Installation and Site Requirements.

- (1) Installation shall be at a site approved by FGIS, according to the manufacturer's instructions and so that neither the operation nor the performance of the equipment or system will be adversely affected by the foundation, supports, or any other characteristic of the installation.
- (2) Primary samplers must be installed in such a location as to ensure the representativeness of the samples obtained.
 - (a) "Out" movement samplers. Primary samplers must be installed after the final elevation of the commodity, as close as physically practicable to the end of the loading spout. Final elevation is defined as the last elevation by bucket elevator, pneumatic sucker, drag, paddle, screw conveyor, or other devices. Inclined belts are not considered an elevation, since they will not cause grain breakage.
 - 1) Primary samplers must not be installed in vertical spouts with long drops or sharp-angled turns.
 - 2) The sampler must be located so that all of the grain sampled will be delivered to the carrier. This can be a problem when grain has been sampled, but then a small part of it will not fit in the carrier and is returned to the house or put in a different carrier. This renders the sample non-representative.

- a) For example, the sampler must not be located above an upper scale garner when loading rail cars. If so, it could result in some grain sampled (the grain in the garner) actually going to the next car in line.
 - b) At barge loading sites the amount of grain retained in a garner or on a section of belt that is sampled but does not get loaded aboard the barge will need to be calculated. If significant, special procedures will need to be developed to clear the system or it cannot be approved.
 - c) For ship sublots, the garner amount effect on the sample is usually insignificant.
- (b) "In" movement samplers. Primary samplers must be installed before or immediately after the initial elevation of the commodity. Initial elevation is defined as the first elevation by bucket elevator, pneumatic sucker, drag, paddle, screw conveyor, or other devices. Elevation by marine leg at barge unloading sites is also considered an initial elevation.
- (3) If screw or drag conveyors, swivel loaders, belt-type throwers, or air-blast throwers are used to propel the commodity after sampling for outbound inspection, or before sampling for inbound inspection, the facility operator shall furnish evidence based on comparison testing that their use does not alter the condition of the commodity.
- (4) The secondary sampler must be mounted in a vertical, reasonably-level position, and be located as close to the primary sampler as possible. In facilities where this is not practical, or in facilities where manlifts would be the only means of transporting samples and personnel to and from the sampler, the secondary sampler may be installed at ground level. This does not eliminate the need for a safe means of access to the primary sampler for examination purposes.
- (5) The primary and secondary sites must be free of hazards that jeopardize the safety of official inspection personnel.
- (6) Adequate floor space, as defined by official personnel, must be provided at the proposed sites.

- (7) Protection and guards must be provided for floor and bin openings, low beams, spouts, moving belts, and chains.
- (8) The sites must be kept clean and free of excessive dust, spilled commodities and refuse. Regular cleaning must be a part of the facility's maintenance program.
- (9) Lighting at the primary sampler installation site must be a minimum intensity of 30-foot candles to allow thorough examinations of the primary sampler. Where artificial lighting is used, it should be permanently installed rather than portable.
- (10) Safe access to the primary sampler site and the sampler shall be provided by passenger elevators, stairs, or approved ladders. Stairs and ladders must meet safety standards (29 CFR 1910.24, .27, etc.) Consult with the field office collateral duty safety officer (CDSO) for assistance in applying these standards.
- (11) Approved lockout switches shall be installed, and approved lockout procedures shall be used to ensure the safety of personnel examining the primary and secondary samplers. Further information can be found in 29 CFR 1910.147, *The control of hazardous energy sources (lockout/tagout)*.

A *lockout switch* is defined as a device that will disconnect the main power supply and bring the D/T sampler to a zero energy state. The lockout switch must be under the exclusive control of the person making an examination through locking devices such as a padlock. Zero energy state includes all mechanical, electrical, hydraulic, and pneumatic equipment that may cause the D/T to operate. Lockout procedures are specified in Chapter 4.

d. Timer Requirements.

- (1) Timers may be analog or digital. (Automated systems having timers that reside in programmable controller logic require special evaluation and approval from FGIS headquarters.)
- (2) For official use, analog timers do not need and should not have a maximum dial setting greater than 5 minutes, since all required settings are 3 minutes

or less. Timers with large maximum settings may have less accuracy in lower ranges.

- (3) Precision timing is not required. However, a properly functioning timer must be accurate to approximately ± 1 division; e.g., an Eagle timer of 60 seconds maximum dial setting, marked in 1-second divisions must be accurate ± 1 second at any setting. If not, it must be repaired or replaced.
- (4) When the commodity flow rate is 4,000 bushels or less per hour, set the timer at not more than 3 minutes.
- (5) When the flow rate is more than 4,000 bushels per hour, set the timer so that the pelican traverses the sampling area each 200 bushels, unless the flow rate lends itself to a larger sampling interval as decided by the inspector in charge, using Table I.
- (6) Actual flow rate past the sampler is not always equal to the facility's claimed load out rate. Use the flow rate of the facility's predominant grain to figure out the timer setting.

For example: An elevator has one D/T sampler located under Scale No. 1 used to load out hopper cars of corn. The scale holds about 170 bushels, and the discharge takes 15 seconds. This equals 40,000 bushels per hour (bu/hr) going past the sampler. The scale will take another 15 seconds to fill each scale draft, lessening the facility's load out rate to 20,000 bu/hr or less. If the facility is inefficient at moving cars, etc., it may not even load as fast as 20,000 bu/hr, but the timer setting would still be based on 40,000 bu/hr. Referring to Table I, the timer setting could be either 18 or 31 seconds.

- (7) If the recommended timer settings yield too much or too little sample in the collection box, it is an indication that the secondary sampler does not offer the appropriate reduction. It may be necessary to repair, replace, or adjust the secondary.
- (8) If needed, the timer can be set to take cuts more frequently than shown in the table, but this is not recommended. Turning up the timer may cause the secondary to back up.
- (9) Use one timer setting for both testing and official sampling.
- (10) Do not change timer settings for different grains or carriers except as approved and noted on the Form FGIS-998.

- (11) Do not change timer settings during official sampling. For example, if 5,000 grams represent the sample from one bin, another similar bin should be represented by 5,000 grams, too. When timer settings are changed, this proportional relationship is lost.
- (12) Scale dump counters are not allowed on or in lieu of the timer circuit, since they do not allow cuts to be taken randomly throughout the lot.
- (13) Energy to the timer circuit should not be interrupted by counters, gate interlocks, or programmable controllers, since the timer will reset to zero and randomness of sampler cuts will be lost. (Safety lockout switches must disconnect timer circuits and also motor circuits.) Headquarters may grant an exception when circuit interrupts for the sampler motor are needed, if properly justified.

Table I

Timer Settings			
Flow Rate Past Sampler (bu/hr)	Sampling Rate (Seconds) One cut each:		
	200 bu	350 bu	500 bu
10,000	72		
15,000	48		
20,000	36		
25,000	28		
30,000	24		
35,000	20		
40,000	18	31	
45,000	16	28	
50,000	14	25	
55,000	13	22	32
60,000	12	21	30
65,000		19	27
70,000		18	25
75,000		16	24
100,000			18
125,000			14
150,000			12

$$3,600 \text{ (s/hr)} * 200 \text{ (bu) sampling rate} / \text{max flow (bu/hr)} = \text{timer setting (s)}$$

- e. **Mixing and Blending Requirements.**
 - (1) Mixing and blending of the commodity to be sampled must be completed before the commodity reaches the primary sampler. If multiple samplers (more than one conveyor belt or spout) are used, the feed to each must be uniform in kind and quality.
 - (2) If an offgrade commodity is placed in the shipping bin, a procedure must be developed to ensure that the entire quantity of offgrade commodity is returned to the facility. Multibottomed or windowed shipping bins may cause segregation of the commodity. Therefore, when an offgrade commodity has been loaded into one section, all of the commodity in the sections joined by windows must be returned to the facility.
- f. **Lot Integrity Requirements.** There must be no provision for adding material (except insecticides) or removing material from the commodity after it has passed the primary sampler. If there are feeders or diversion points between the sampler and the carrier, the points must be closed securely by using locks, seals, or electronic security measures that are under the complete control of the sampling attendant. When security measures include visual monitoring, the monitoring must be continuous—not intermittent.

2.2 POINT-TYPE MECHANICAL SAMPLING SYSTEMS.

Point-type mechanical sampling systems are approved only for Group 3 powdered commodities. These commodities are more homogeneous than the other groups and have less particle segregation. They do not use a pelican to completely cross cut the stream of commodity through a spout. Instead, they often use a tube with a hole or slot and an auger delivery system. Specifications for point-type samplers are identical to those for diverter-type samplers except for pelican design and timer settings, which are not applicable.

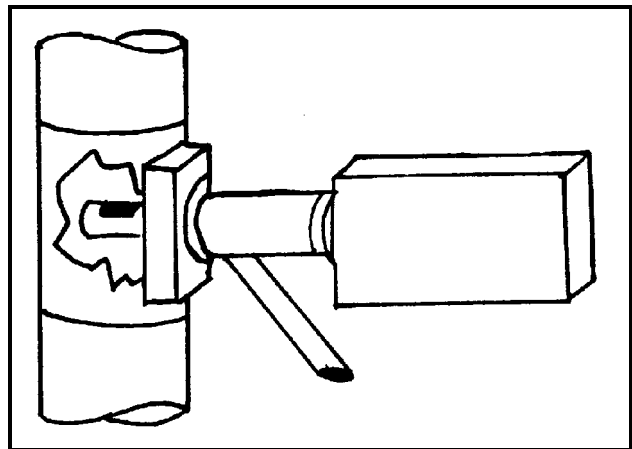


Figure 2. Point-Type Sampler

2.3 PROBE-TYPE MECHANICAL SAMPLERS (TRUCK PROBES).

a. General Requirements.

- (1) The model and type of probe-type mechanical sampler must be approved by FGIS. Figure 3 shows the current designs, of which two are approved. In-load suction probes may not be tested or approved. They draw air through the load of grain and vacuum excessive amounts of fine foreign material into the sample.
- (2) The system must be authorized for official use based on the tests specified in Chapter 5.

b. Installation and Site Requirements.

- (1) The facility must be free of hazards that jeopardize the safety of official inspection personnel.
- (2) The site must be kept clean and free of excessive dust, spilled commodities, and refuse.
- (3) The reach of the probe must enable the operator to follow the standard probing patterns and procedures. Normally a truck would not need to be moved more than once to reach all areas of the load.

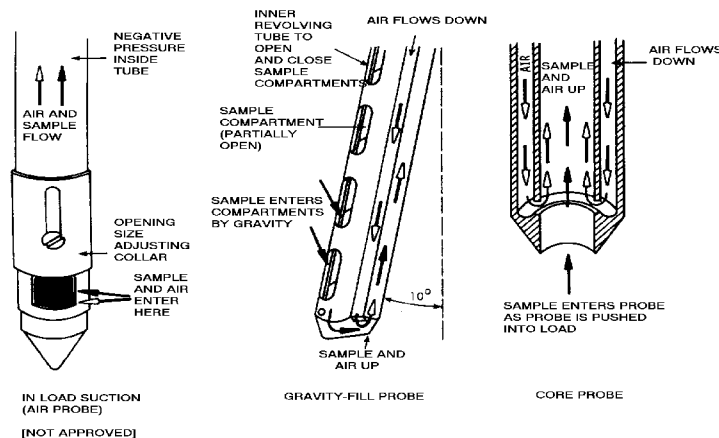


Figure 3. Probe-Type Samplers

- (4) The length of the probe should enable the operator to reach the bottom of truck loads that are sampled.
 - (5) Lockout switches and/or devices must be installed.
- c. Installation Procedures. Probe-type mechanical sampling systems must be installed according to the manufacturer's specifications. After testing, secure all adjustable components that affect air flow by use of covers, seals, locks, or electronic security measures.

2.4 WOODSIDE SAMPLERS.

- a. There are few woodside sampler installations remaining approved for official grain inspection. Woodside samplers have not been manufactured for many years, and parts are difficult to obtain or fabricate.
- b. Diverter-type mechanical samplers generally require less official supervision and provide a more representative sample at the higher grain flow rates that are used today. FGIS believes that the elimination of woodside samplers from the official system will provide for greater uniformity and reduce unnecessary administrative costs.
- c. Existing approved woodside samplers may remain authorized, if they are presently used for official sampling. Official personnel were notified 2-11-94 that if the authorized woodside sampler was not used officially, or used only for in-house quality control, the facility should be notified that the authorization will be revoked effective 1 year from that date.
- d. No new applications for authorization of woodside samplers will be accepted.

Chapter 3

AUTHORIZATION

3.1 RESPONSIBILITIES.

- a. Facility Management. The operator of the facility that owns, leases, or operates the mechanical sampling system shall:
 - (1) Initiate a written request letter for authorization of the system;
 - (2) Prepare all necessary drawings needed for the authorization (Figure 4);
 - (3) Install approved equipment in the correct manner as prescribed by the manufacturer;
 - (4) Cooperate in examining and testing the system;
 - (5) Maintain the system in the proper environment and in the proper manner;
 - (6) Repair the system, when needed;
 - (7) Sign the authorization indicating agreement with its requirements.
 - (8) Notify the testing office, in writing, (official agency or FGIS field office, as applicable) when:
 - (a) Any physical changes in equipment or facility operations (such as flow rate, added dust collection) occur that may affect the flow to, through or after the sampling system;
 - (b) Alterations to the system are planned (any type);
 - (c) The system will no longer be used for official inspection work;
 - (d) The facility will not be operational for more than 6 months.

- b. Testing Office. The official agency or FGIS field office that will use the mechanical sampling system for official inspection service must ensure that the system provides a representative sample. This is an essential function. These offices shall:
- (1) Examine the proposed site and determine whether it conforms with the requirements for installation and use of the sampling system. Document problem areas and review them with the facility management.
 - (2) Complete Form FGIS-998, "Questionnaire for Proposed Diverter-Type Mechanical Sampler" (Figure 5); or provide a complete questionnaire on the proposed site and system including usage information, location, loading or unloading rate, name of owner, material to be sampled, etc.
 - (3) Review the site and installation drawings for accuracy. Sign and date the drawings, if they accurately represent the system as installed.
 - (4) At export port locations, do monthly sampler checks (minimum frequency). See Chapter 4.
 - (5) Perform initial, periodic (minimum every 6 months) and supplemental examinations of the site and sampling system.
 - (6) Perform initial, periodic and supplemental testing, as necessary, to determine system accuracy, when first installed or modified.
 - (7) Notify the FGIS field office of any condition that may warrant formal suspension of an authorization.
 - (8) Perform the following record keeping for each system:
 - (a) Prepare Form FGIS-936, "Sampler Condition Report" for each series of examinations and tests performed according to items 5 and 6, above.
 - (b) Forward the original copy of the written request, drawing, Form FGIS-998 and a copy of the Form FGIS-936 to the supervising FGIS field office (when an FGIS field office is the testing office, this material shall be maintained in a permanent file).
 - (c) Maintain the following records:

- 1) A copy of the request for authorization, drawings of the site and installation drawings provided by the manufacturer showing necessary dimensions, flow rates, belt speeds, etc.;
 - 2) A copy of the completed Form FGIS-998 for proposed diverter-type, probe-type or point-type mechanical sampler installation;
 - 3) A copy of the completed Form FGIS-980, "Authorization to Use Mechanical Sampler for Sampling;" and
 - 4) The original copy of all Form FGIS-936's, issued within the last 5 years.
- c. FGIS Field Office. The FGIS field office that supervises the testing office (or sometimes is the testing office) shall:
- (1) Provide supervision and assistance to the testing office;
 - (2) Provide data for the national database;
 - (3) Prepare and execute (or finalize) Form FGIS-980 after the initial, successful test of the sampler has been completed;
 - (4) Prepare and execute (or finalize) revised Form FGIS-980 for changes in ownership, equipment, agency, etc.;
 - (5) Formally suspend or cancel authorizations, in writing, when warranted;
 - (6) Maintain the following records on each sampler in the field office's circuit:
 - (a) The original copy of the request for authorization, drawings of the site and installation drawings provided by the manufacturer showing necessary dimensions, flow rates, belt speeds, etc.;
 - (b) The original copy of the completed Form FGIS-998 for proposed diverter-type, probe-type or point-type mechanical sampler installation; and

- (c) The original of the completed Form FGIS–980.
- d. FGIS Headquarters. The office in charge of the mechanical sampler testing program shall:
 - (1) Evaluate and grant or deny approval of prototype mechanical sampling equipment and systems;
 - (2) Provide technical support to FGIS field offices, and
 - (3) Maintain a national database updated annually, showing basic information for each official mechanical sampling system, such as: ELEVATOR, LOCATION, AGENCY, FIELD OFFICE.
- e. FGIS Technical Center. The Technical Center shall provide statistical analysis of mechanical truck probe testing data.

3.2 REQUEST FOR INFORMATION.

Facility operators interested in installing mechanical sampling systems for official inspection purposes should contact the local FGIS field office for information and assistance. Inquiries should be made through the official agency when the area is served by an official agency.

3.3 REQUEST FOR AUTHORIZATION.

- a. Preparation of Request. The operator of the facility should request authorization of a proposed mechanical sampling system in writing, and include a copy of the installation drawing(s) provided by the manufacturer and a complete description, by model and type of equipment, of the sampling system including a drawing or sketch of the proposed system. The drawing must show the proposed sampling system (See Figure 4.) in relation to the following items, as applicable (distances to be shown in feet or meters):
 - (1) Scales, scale hoppers and surge bins;
 - (2) Dump pits;
 - (3) Elevating legs and conveyors;
 - (4) Cleaning and shipping bins;
 - (5) Loading and/or receiving spouts and belts;

- (6) Official inspection laboratory and/or sample collection box location;
 - (7) Dust collection near the sampler; and
 - (8) Sampler access and lockout switch.
- b. Distribution of Request. The facility must send the request, with drawings, to the official agency or FGIS field office that provides original inspection service to the specified service point in which the facility is located (the testing office).
- c. Response to Request.
 - (1) Upon receipt of the request, the testing office shall promptly examine the site proposed for the sampling system and determine whether the site and the arrangements conform with the basic requirements for the installation of mechanical sampling systems. If they do not, the testing office must document and review the problem areas with the facility operator.
 - (2) Promptly after that, the testing office shall complete a Form FGIS-998. Then, the testing office shall send to the FGIS field office manager, the written request, drawings and installation data, and the completed Form FGIS-998 showing needed changes. Also, send a copy of the completed form to the facility operator.
 - (3) After reviewing the written request, the drawing and the completed Form FGIS-998, the FGIS field office in charge of the specified service point at which the sampling system is located shall determine if the system meets all requirements (See Chapter 2.) If so, FGIS shall direct the testing office to do an examination and test. When the system does not comply with all authorization requirements, the testing office will be instructed to review the problem areas with the facility management.

3.4 ISSUANCE OF AUTHORIZATION.

- a. Granting of Authorization. Upon notification of a successful test, the FGIS field office shall prepare and issue (or finalize) the Form FGIS-980, "Authorization to Use Mechanical Sampler for Sampling" (Figure 6).
 - (1) The authorization is an agreement among representatives of the facility where the sampling system is installed, the testing office, the FGIS field office and any other persons or firms that may be directly involved.
 - (2) The agreement says that the sampler shall be installed, serviced, operated, and maintained following existing regulations.

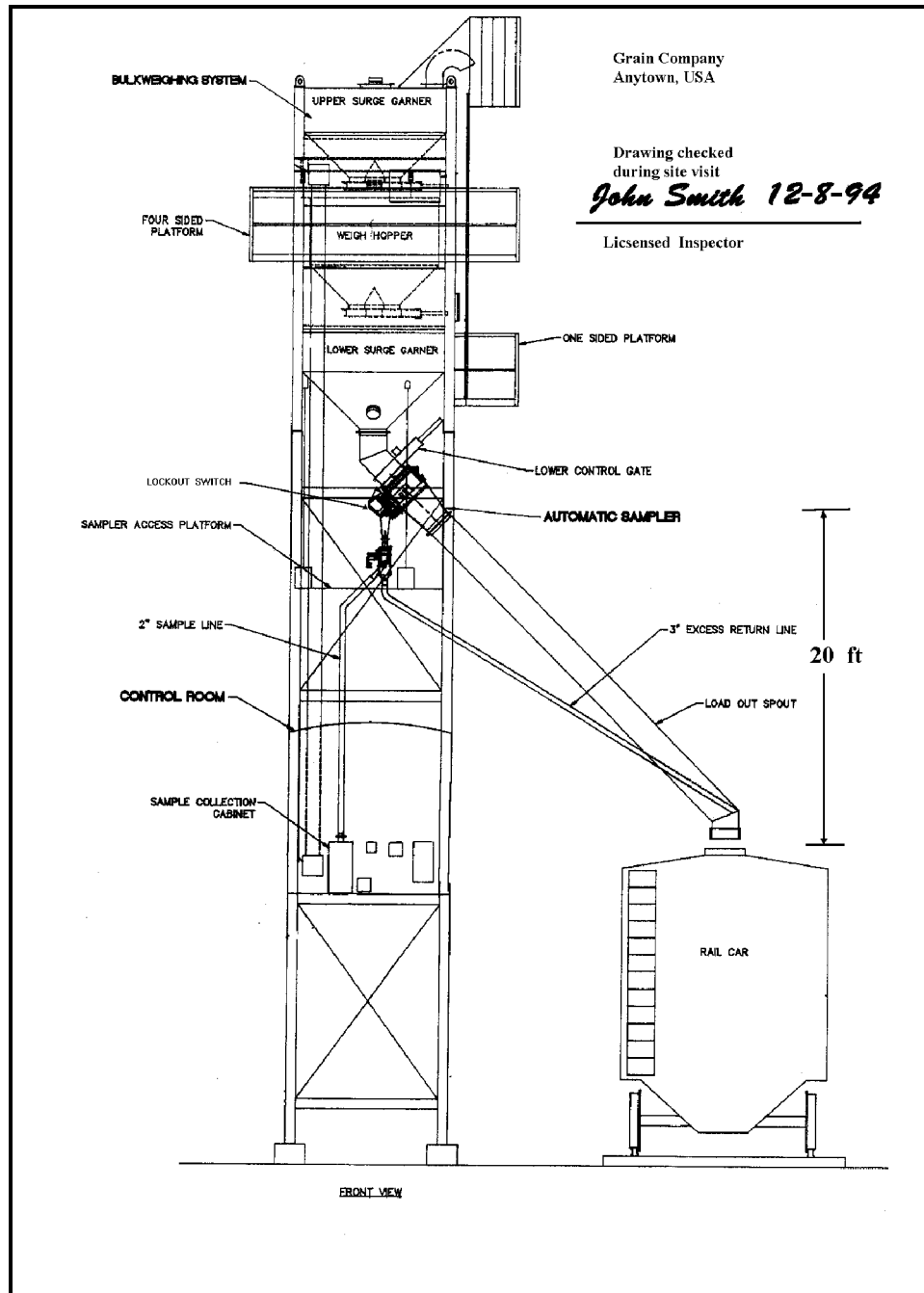


Figure 5. Diverter-Type Sampler Site Drawing

U.S. Department of Agriculture Grain Inspection, Packers and Stockyards Administration QUESTIONNAIRE FOR PROPOSED DIVERTER-TYPE MECHANICAL SAMPLER		OMB APPROVED NO. 0580-0013 <small>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Officer, OIRM, AG Box 7630, Washington DC 20250; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20250-7630.</small>	
Facility Name, City, State 1		Capacity 4	
Field Office 2			
Kind of Elevator 3 <input type="checkbox"/> Country <input type="checkbox"/> Terminal <input type="checkbox"/> Export			
Authorization Code - Circle Appropriate Numbers D Diverter N Non-diverter P Probe O All Grains 1 Small Grains 2 Coarse Grains - No Corn 3 In 4 Out 5 Cargo 6 Barges 7 Hopper Cars 8 Carlots 9 Trucks			
D/T Make and Model 6	S/N 7	<input type="checkbox"/> Spout <input type="checkbox"/> Belt 8	Spout/Belt Size 9
General Location 10	Spout/Belt Name 11	Spout/Belt Angle 12	Belt Speed 13
Power: 14 <input type="checkbox"/> Air <input type="checkbox"/> Electric	Body Dimensions 15	Pelican Stroke 16	Pelican Opening L x W 17
Grain Drop Before Sampler 18 (ft)	Grain Drop After Sampler 19 (ft)	Access Safe 20 <input type="checkbox"/> Yes <input type="checkbox"/> No	Inspection door OK? 21 <input type="checkbox"/> Yes <input type="checkbox"/> No
Verified No Auxiliary Controls 22 <input type="checkbox"/> Yes <input type="checkbox"/> No	Location of Lockout 23 <input type="checkbox"/> Yes <input type="checkbox"/> No	Lights OK for Exam 24 <input type="checkbox"/> Yes <input type="checkbox"/> No	
Is Pelican Movement Ready? 25 <input type="checkbox"/> Yes <input type="checkbox"/> No	Does Pressure Return Promptly? 26 <input type="checkbox"/> Yes <input type="checkbox"/> No	Air Pressure at Res. 27	
Timer Make and Model 28	Grain Flow Rate Pass Sampler 29	Calculated Timer Setting 30	
Secondary Make and Model 31	S/N 32	Delivery System 33 <input type="checkbox"/> Gravity <input type="checkbox"/> Pneumatic	Grams Per Sample 34
Total No. of Samples 35	Quantity Adjustment Sealed? 36 <input type="checkbox"/> Yes <input type="checkbox"/> No	Delivery and Collection Box Secure? 37 <input type="checkbox"/> Yes <input type="checkbox"/> No	Excess Returned to Lot? 38 <input type="checkbox"/> Yes <input type="checkbox"/> No
Dust Control Locations 39			
Weights: 40 <input type="checkbox"/> GIPSA Class X <input type="checkbox"/> GIPSA Class Y <input type="checkbox"/> Certified <input type="checkbox"/> Other _____			
Number of Shipping Bins: 41	Depth 42 (ft)	Graded <input type="checkbox"/> Before 43 <input type="checkbox"/> After Release?	Procedures to Stop Breakage: 44
Carrier I. D. by: 45 <input type="checkbox"/> Radio <input type="checkbox"/> Visual <input type="checkbox"/> Other _____			
Remarks/special restrictions when used to sample officially: 46			
Signature of Official Personnel: 47			Date: 48

FGIS 998 (11/94) Previous Editions Obsolete

Figure 5. FORM FGIS 998, "QUESTIONNAIRE FOR PROPOSED DIVERTER-TYPE MECHANICAL SAMPLER"

DIRECTIONS FOR COMPLETING QUESTIONNAIRE

1. Facility name, city, and state.
2. Name of FGIS field office.
3. Check the box indicating kind of elevator.
4. Storage capacity of elevator.
5. Authorization Code—circle the numbers that apply to the intended sampler use.
6. Sampler Make & Model; e.g., Gamet 6800S.
7. Sampler Serial Number.
8. Is the sampler in a spout or on a belt end?
9. For spout samplers—diameter or length x width cross sectional measurements or;
Belt Size—width and depth of grain carried.
10. General location of sampler; e.g., Headhouse 6th Floor; or Gallery.
11. Spout/belt name; e.g., Scale #1 lower garner.
12. Spout angle—90° is vertical. Belt Angle—0° is horizontal. Show normal angle and max/min limits of travel, if angle can be varied.
13. Belt speed—measure with belt loaded.
14. Check the box showing type of power.
15. Body dimensions for the sampler.
16. Pelican stroke is the distance traveled from one side to the other.
17. Length and width of the pelican opening.
18. Distance in feet from release point.
19. Distance grain falls is used to estimate impact and breakage. For example, measure from sampler to bin bottom.
20. Is access to the sampler by approved ladder or stairs, and does the platform have an approved railing?
21. Are the inspection doors properly located on the sampler? Do they have appropriate seal hasps and hinges?
22. Check *verified* after you determine that the system controls have no bypasses, dump counters, timer interrupts, or programmable controllers.
23. Location of lockout ok—does the lockout provided meet FGIS requirements?
24. Light for examinations—can all exterior examination checks be made with lighting supplied?
25. For pneumatic/hydraulic samplers—is pressure sufficient to move the pelican across the stream of grain evenly, without lagging or slowing down.
26. For pneumatic/hydraulic samplers—pressure returns to maximum before next cut is initiated.

27. For pneumatic samplers—gauge pressure at rest. Maximum reached when no cuts are initiated.
28. Timer Make & Model; e.g., Eagle HP5 Model 9.
29. Flow past sampler should be figured out by timing a known amount, such as one scale draft, as it passes the sampler.
30. Calculate the timer setting in seconds based on grain flow rate past sampler. Also show whether this is based on a 200, 350, or 500 bushel sampling rate.
31. Secondary Sampler (divider) Make & Model; e.g., InterSystems MD300.
32. Secondary Sampler Serial Number.
33. Check box indicating type of sample delivery system.
34. Weight in grams received for the official sample.
35. Total number of samples needed for all interested parties.
36. Are the quantity adjustment features on secondary sampler fixed or sealed in place?
37. Is the sample delivery system secure from the air inlet to the collection box?
38. Is excess grain automatically returned from the secondary to the lot from which the sample was taken?
39. Location of dust collection ducts—are they located where they can affect the sample constituents? The measurements will serve as a record of approved duct work.
40. Weights—are weights official; i.e., supervised under the USGSA as Class X or Y—are weights "Certified"; i.e., supervised unofficially by a local organization—or are weights unofficial and not supervised, or not provided?
41. Shipping bins—number used.
42. Shipping bin depth(s).
43. Grading—will bin be held for grade or factor results before being released?
44. Procedures to stop breakage—will the bins require use of cushion level indicators, grain ladders, or baffles to reduce impact of grain and resulting breakage?
45. Carrier identification or stowage locations.
46. Special restrictions—any special procedural restrictions; e.g., weighback belt must be sealed, turnhead must be locked in position, cushion must be maintained in shipping bin, etc.
47. Signature of the official personnel who filled out the questionnaire.
48. Date information obtained.

b. Distribution of Form FGIS-980.

(1) The FGIS field office will distribute copies of the Form FGIS-980 to each person who has signed the authorization. A certificate is not issued for the authorization of a sampling system.

(a) For each newly authorized diverter-type mechanical sampling system, the FGIS field office will forward a copy of Form FGIS-980 and a copy of the initial Form FGIS-936 to:

Grain Contract Branch, USDA-CFSA
 Storage Contract Division
 Kansas City Commodity Office
 P.O. Box 419205
 Kansas City, Missouri 64141

Table II. Summary of Distribution and Record Keeping

Office	Prepares	Files Original	Files Copy
Facility	<i>Request Letter</i> <i>Site Drawings</i>		
Testing Office¹	<i>FGIS-998</i> <i>FGIS-936</i>	<i>FGIS-936</i> <i>(except initial)</i>	<i>Request Letter</i> <i>Site Drawings</i> <i>FGIS-998</i> <i>FGIS-936 (initial)</i> <i>FGIS-980</i>
Field Office	<i>FGIS-980</i>	<i>Request Letter</i> <i>Site Drawings</i> <i>FGIS-998</i> <i>FGIS-936 (initial)</i> <i>FGIS-980</i>	
Headquarters			

¹ When the field office is also the testing office, retain all original records.

CFSA			<i>FGIS-936 (initial)</i> <i>FGIS-980</i>
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3.5 SUSPENSION OF AUTHORIZATION.

- a. Causes for Suspension. The sampling attendant or testing office must stop use of the mechanical sampling system when there are causes for suspension. If the causes are not corrected in a timely manner, notify the FGIS field office in charge so FGIS can suspend the authorization in writing. Suspend the authorization if the sampling system is:
 - (1) Out of repair;
 - (2) Found with security seals broken or locks removed without explanation²;
 - (3) Altered, without being granted prior approval for the alteration;
 - (4) Not maintained according to the established procedures;
 - (5) Not able to be examined or tested when due;
 - (6) Examined and found to have one or more unsatisfactory items;
 - (7) Tested and found out of tolerance; or
 - (8) Of questionable accuracy or representativeness, for any reason, such as deficiencies noted by the sampling attendant.
- b. Procedure for Suspending an Authorization. To suspend an authorization, FGIS notifies facility management in writing that their authorization is suspended (See Figure 8.) and prepares a written report of the action, including all pertinent facts. File and maintain the documentation with the system's Form FGIS-980.

² Unauthorized seal breakage or lock removal can cause increased cost to industry. A controlled point caution label or tag may be used on sampler inspection doors, but do not use the label itself as a sealing device. Use the caution label/tag only in conjunction with a metal seal or lock. See Figure 7 for examples of approved designs for "Controlled Point Caution Labels and Tags."

- c. Cause for Cancellation and Procedure for Canceling an Authorization. At the discretion of the FGIS field office in charge, an authorization may be canceled if the system has been suspended for more than 6 months. To cancel an authorization, FGIS notifies facility management in writing that their authorization is canceled and prepares a written report of the action, including all pertinent facts. File and maintain the report with the system's Form FGIS-980.
- d. Reinstatement. FGIS shall reinstate suspended sampling systems upon satisfactory completion of all necessary repairs or reactivation of the facility, and a satisfactory examination (or test) of the system by the testing office. The completed Form FGIS-936 will serve as a record of the reinstatement.

United States Department of Agriculture
Federal Grain Inspection Service

AUTHORIZATION TO USE MECHANICAL SAMPLER FOR SAMPLING

Installed in: (Name of facility)	Mechanical Sampler Make & Model	Serial Number
City and State	Secondary Sampler (Divider) Make & Model	Serial Number

Commodity to be sampled:

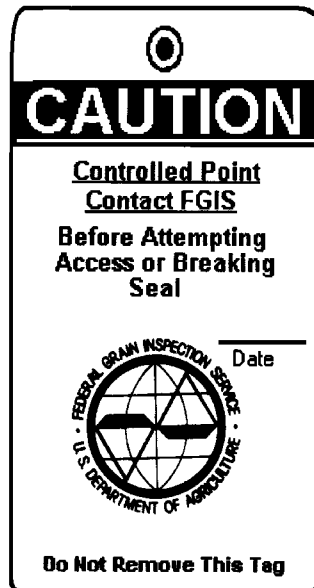
☐ All Grains (Groups 1 & 2)
 ☐ Coarse Grains Except Corn
 ☐ Small Grains (Group 1)
 ☐ Powders (Group 3)

Subject to the conditions listed below, authorization is issued to official inspection personnel to use the mechanical sampler for the official sampling of the commodities as indicated above. All interested parties shall be notified by FGIS when the authorization has been suspended or cancelled.

1. Facility management shall service and maintain the mechanical samplers in accordance with existing regulations and instructions under the U.S. Grain Standards Act and the Agricultural Marketing Act of 1946.
2. Official personnel shall make daily or more frequent spot checks, when the samplers are in use for official sampling, to determine that the mechanical samplers are being serviced, operated, and maintained in an approved manner.
3. The mechanical samplers shall be secured or constantly manned by official personnel when they are used for official sampling.
4. All quantities in excess of the amounts required for the official inspection shall be returned to the carrier or the stream of grain or other commodity being sampled.
5. No changes in structure, accessories, location or operation of the mechanical samplers shall be made without specific written authorization from the FGIS Field Office Manager.
6. No manipulation of the commodities to be sampled or other efforts shall be made which would result in the above mechanical samplers failing to obtain and deliver a correct and representative sample.
7. The elevator manager acknowledges personal responsibility for the correct installation of the mechanical samplers.
8. This shall be signed by the manager or superintendent of the facility on behalf of the company that operates the elevator or plant in which the mechanical samplers are installed, and by the Agency or Field Office Manager whose personnel will attend the sampler.
9. The authorization shall be automatically suspended for noncompliance with any of the above conditions; but may be reinstated when corrective action has been taken and approved by the Field Office Manager.

_____ Name of Facility		_____ Facility Manager Signature
_____ Date	_____ Location	
_____ Official Agency		_____ Agency Manager Signature
_____ Date	_____ Location	Authorization Approved - USDA
_____ Date	_____ Field Office Location	_____ Field Office Manager Signature
Form FGIS-980 (4-94)		Authorization Code: _____

Figure 6. Form FGIS-980



INSPECTION RECORD	
EQUIPMENT ID :	
DATE :	BY :
Do Not Remove This Tag	
(Reverse Side)	

Figure 7. Controlled Point Caution Label and Tag



United States
Department of
Agriculture

Grain Inspection,
Packers and Stockyards
Administration

Federal Grain
Inspection
Service

April 28, 1995

Grain Company
Anytown, USA

Dear Sir:

According to information which this office recently received, your diverter-type mechanical sampler, serial N^o G-7335 was not examined on schedule by the official agency in your area, due to your facility being temporarily closed for maintenance.

Therefore, as of this date, the authorization to use the mechanical sampler identified above for official inspection purposes is suspended. If you need the authorization reinstated at a future date, please contact the official agency.

Sincerely,

Field Office Manager

cc: Official Agency
 CFSA, Kansas City

Figure 8. Example of Suspension Letter

Chapter 4

EXAMINATIONS

4.1 MONTHLY CHECKS AT EXPORT PORT LOCATIONS.

Once a month—at a minimum—licensed or authorized personnel must do a general condition and security check of all diverter-type samplers at export locations.

- a. Examine the site for unauthorized modifications, such as unauthorized dust collection equipment.
- b. Stop the sampler with the pelican positioned so it can be inspected and gauged. This may be mid-spout or parked at the side, depending on the location of the inspection door.
- c. Follow lockout procedures on Page 4-4.
- d. Record seal or lock identification numbers. Open the primary and secondary sampler inspection doors.
- e. Examine the pelican for damage. Use the go-no-go gauge to check for the correct pelican opening ($\frac{3}{4}$ to $\frac{7}{8}$ inch.)
- f. Check that the dust seals are undamaged.
- g. Check for objects stuck in the pelican opening or body.
- h. Check the secondary sampler and delivery tube for plugs.
- i. Release the equipment from lockout using procedures on Page 4-4.
- j. Using the panel controls, energize the sampler to allow the pelican to come to rest under the left dust seal. Turn off power. Open the inspection door. Do not place your hands or any tools into the sampler.

- k. Visually find out if the pelican fits against the dust seal. Repeat for the right dust seal.
- l. Reseal or lock the inspection plates, record the seal or lock identification numbers. Record the results of the monthly check in a logbook; include the date and your name or initials. When a 6-month condition examination is performed instead of the monthly check, write, "See 6-month condition examination file for (month) check results." in the logbook. Maintain the log book at the work site, under control of official personnel.
- m. If physical or mechanical problems (such as: torn dust seals, bent pelican) are observed, do not use the sampler until the problems have been corrected. Inform your supervisor and elevator management. Document the problem, repair, and all subsequent activities.

4.2 INITIAL EXAMINATION.

Immediately before the first test, thoroughly examine the sampling system and its immediate area and record the condition on the front page of Form FGIS-936, "Sampler Condition Report." The examination shall encompass all items listed on the Form FGIS-936 and any other items deemed necessary by the testing office. Sampling systems found to have one or more unsatisfactory items shall not be authorized.

4.3 PERIODIC EXAMINATION.

Periodically, examine the sampling system and its immediate area thoroughly and record the condition on Form FGIS-936. The examination shall encompass all items listed on the Form FGIS-936 and any other items deemed necessary by the testing office. A sampling system that fails a periodic examination may also be required to be retested before its authorization is reinstated. If a mechanical sampling system is not being used when it is due for examination or testing, it may be delayed until the system is again being used. Unless the facility is seasonal, a formal suspension may be required if necessary to ensure the system is not used officially.

- a. Reexamine diverter-type and point-type sampling systems at least once every 6 months, regardless of the type of facility where located. Calculate the period starting from the first day of the next calendar month after the examination.
- b. Examine and test probe-type sampling systems (10 trucks for retests) at least once every 12 months. Calculate the period starting from the first day of the next calendar month after the examination and test.

4.4 SUPPLEMENTAL EXAMINATIONS.

- a. When official inspection personnel have auxiliary samples or other information that shows the sampling system to be of questionable accuracy, the testing office shall examine and test the system (for example, noticeable variations between the quality of the grain and the sample, significant differences between samples of the same lot drawn at the same time by different primary samplers, or inexplicable variations between origin and destination inspections). When performing the test and the first test lot is found within tolerance, no additional tests are required. If the first test lot is not within tolerance, test four additional lots and average the results of the five test lots to learn if the system is in tolerance. When origin and destination are involved in grade differences that suggest sampling problems, headquarters must arrange to test both samplers.
- b. If repairs are made, the testing office shall examine the system and decide whether a test is necessary to ensure that the system's accuracy has not been affected. A simple replacement of parts with equivalent pieces of equipment may require only an examination; a major repair or replacement of the primary or secondary sampler requires testing with five test lots.
- c. After a system has been altered by addition, deletion, or relocation of primary samplers, secondary samplers, and/or sample delivery equipment, the testing office shall test the system using five test lots.
- d. Diverter-type sampling systems are designed to function at the maximum flow rate specified by the facility at the time of installation. Facilities increasing commodity flow rates, by changing the handling equipment, may exceed the capacity of the sampling system. When sampling systems are being used in locations where commodity flow rates have been increased after installation and original authorization, the testing office shall examine and test the system using one test lot.
- e. If a commodity handling system is upgraded by either the addition of dust collection units or by operating the existing dust collection units with increased airflow (on or near the mechanical sampler), the testing office shall examine and test the system (one test lot).

- 4.5 LOCKOUT PROCEDURES—Each office must develop, document and utilize specific written lockout procedures for each mechanical sampler. The procedures should be based upon the requirements contained in 29 CFR 1910.147, *The control of hazardous energy sources (lockout/tagout)* and the following example.

Use of Procedure. This procedure establishes minimum requirements for lockout of mechanical samplers before employees perform any inspection or maintenance activities where the unexpected energization, start-up, or release of stored energy could cause injury. Types and magnitudes of energy are mechanical movement of pelican, movement of grain, electricity-120/240 volts, and air pressure-100 psi.

Procedural Steps.

- a. Preparation for Shutdown—Trained Employees Only. Notify facility management. Determine the types of energy to be controlled and their sources. Most primary samplers have a timer circuit and a separate motor circuit. Pneumatic or hydraulic sources may need to be disconnected.
- b. Shutdown. Shut the system down using its operating controls. These are the controls we use on a daily basis such as the on-off switches located on the front panels, etc.
- c. Isolation. Operate the energy isolating devices so that the equipment is isolated from its energy sources.
- d. Lockout. Apply lock(s) and properly filled out tag.
- e. Stored energy. Remove stored energy from the equipment. This may require bleeding down air pressure, blocking, or bracing parts, and closing gates.
- f. Verification. Make sure that everyone is clear of the equipment. Try using the operating controls (on-off switch) to verify that the equipment has been successfully de-energized and locked out. Return the controls to "off."

4.6 REMOVING LOCKOUT.

- a. Make sure the equipment is safe to operate.
- b. Notify and make sure everyone is clear of the equipment.

- c. Except in emergencies, only the person who applied the lockout is authorized to remove it.
- d. Follow local rules for returning locks and tags you may have signed out.

MECHANICAL SAMPLING SYSTEMS HANDBOOK

Chapter 4

5-05-95

MECHANICAL SAMPLING SYSTEMS HANDBOOK

Chapter 4

OMB NO.: 0580-0013

U.S. DEPARTMENT OF AGRICULTURE
FEDERAL GRAIN INSPECTION SERVICE

SAMPLER CONDITION REPORT

NAME OF ELEVATOR AND LOCATION (City and State)		DATE EXAMINED 2	FIELD OFFICE 3
NAME OF OFFICIAL AGENCY			

INSTRUCTIONS TO EXAMINER: For a six month examination, fill out the front of this form. For a complete checktest, including initial sampler test, fill out both sides of this form and send the original to the FGIS Field Office. Explain "Unsatisfactory" conditions in detail. If the sampler is not being used, indicate that fact under "Remarks" and prepare a report before the sampler is put into use.

PRIMARY SAMPLER		SECONDARY SAMPLER	
KIND 5	SERIAL NO 6	KIND 7	SERIAL NO 8
GRAIN FLOW RATE (Past Sampler) 9		SAMPLING INTERVAL OF PRIMARY DIVERTER (Cycle time) 10	
		SECONDS	

SAMPLER USED FOR:

☐ BARGELOTS ☐ CARGOLOTS ☐ CARLOTS ☐ TRUCKLOTS ☐ RECEIPTS ☐ SHIPMENTS

ITEMS EXAMINED	SATS-FACTORY	UNSATIS-FACTORY	ITEMS EXAMINED	SATS-FACTORY	UNSATIS-FACTORY
Lighting Around Sampling Areas 12			Cleanliness of Secondary Sampling Area 22		
Safe Access to Sampling Areas and Devices 13			Cleanliness /Condition of Secondary Sampling Device 23		
Lockout (safety switches) 14			Condition of Excess Sample Return Leg or Belt 24		
Cleanliness of Primary Sampling Area 15			Panel Board Indicator Lights 25		
Cleanliness/Condition of Primary Sampling Device 16			Air and/or Hydraulic Oil Pressure 26		
Lubrication of Primary Sampler (if required) 17			Timer Interval Set Correctly 27		
Pelican Speed Approximately 0.5 m/s 18			Delivery Tube Air Inlet Secure 28		
Pelican Dust Seals (interior) 19			Collection Box Secure 29		
Pelican Go-No-Go Gauge 20			Sampler Not Modified/Altered 30		
Pelican Cuts Entire Grain Stream 21			Seals/Padlocks in Place 31		

DECISION ☐ MECH. SAMPLER ACCEPTABLE **32** ☐ MECH. SAMPLER NOT ACCEPTABLE

REMARKS: (Continued on reverse if necessary)

33

Reviewed by: _____

AGRICULTURAL COMMODITY GRADER

34

Inspected by: _____

(LICENSED INSPECTOR OR AGS)

FORM FGIS-936 (3-94) (Previous edition (4-92) is usable, and all others are obsolete)

Figure 8. FORM FGIS-936, "SAMPLER CONDITION REPORT," (FRONT)

INSTRUCTIONS FOR COMPLETING
FORM FGIS-936, "SAMPLER CONDITION REPORT,"
(FRONT)³

1. Name of the elevator, city, and state.
2. Date examination was done.
3. Name of FGIS field office in charge of the circuit.
4. Name of the official agency that does original inspections at the facility.
5. Brand name and type of primary (diverter-type sampler) or probe-type sampler being examined and tested. Are they of a type approved by FGIS?
6. Serial number of primary diverter-type or probe-type sampler.
7. Brand name of secondary sampler.
8. Serial number of secondary sampler.
9. Calculate the maximum flow of spout or belt on which the sampler is installed.
10. Sampling Interval—Read from the timer.
11. Type of carriers or lots the system will sample.
12. Lighting should be approximately 30 footcandles (general task lighting).
13. Safe access includes approved stairs, fixed ladders, platforms, and railings.
14. Lockout switches must be present and meet requirements.
15. Cleanliness of the area—overhead, floor, stairs.
16. Cleanliness/condition of primary—check for plugs, leaks, dust, sprouted grain, broken hasps/hinges, wiring.
17. Lubrication—Grease or oil leaks
18. Pelican speed must be uniform with no slow spots. Speed can be estimated.
19. Pelican dust seals—Must be present, not torn, and must seal-off the pelican, no air gap.
20. Pelican Go-no-go Gauge—Use it to ensure the opening is between $\frac{3}{4}$ and $\frac{7}{8}$ inch wide along its entire length.
21. Pelican cuts stream—If practical, observe a cut to see that the pelican is sampling the entire stream, and that it does not back up from excess grain.
22. Cleanliness of secondary area—overhead, floor, stairs.
23. Cleanliness/condition of secondary—check for plugs, leaks, dust, sprouted grain, broken hasps/hinges, wiring.
24. Condition of excess sample return—Check if it is leaking, infested, or backing up.
25. Panel lights—Use radio or phone (if needed) to ensure that the *power* and *traverse* lights work properly. Have any changes been made in the wiring?

³The reverse of Form FGIS-936 is used for performing a test (grain test). Instructions for completing the reverse are contained in Chapter 5, Tests.

26. Air or hydraulic pressure—Is there enough? Record the gage pressure, if available.
27. Timer—Does the timer setting match the documented setting (required). Use a stopwatch or read the timer; do not rely on posted signs or old records.
28. Delivery tube—Pneumatic systems must have a guard over the air supply inlet.
29. Collection box—If not continuously attended, must be secure at inlet and outlet.
30. Sampler not Modified—For this check, good installation records are essential.
31. Seals—Were the security seals on inspection doors found intact? Was the delivery tube found secure?
32. Decision—If any item is unsatisfactory, the sampler is not acceptable. Keep the *not acceptable* Form FGIS-936 as a record. Even if the facility brings the sampler into compliance immediately, complete another form.
33. An ACG should review some forms for correctness when possible. Any questionable information or remarks must be verified to be accurate.
34. The person doing the examination must certify that it was done correctly.

Reserved

Chapter 5

TESTS

5.1 DIVERTER-TYPE SAMPLER TESTS.

- a. General. Examine⁴ and test⁵ a new diverter-type sampling system before issuing an authorization for official use. Thereafter, test all systems after any major repairs and alterations, and before an authorization suspended more than 6 months for non-use is reinstated. Perform all tests and examinations according to the procedures established herein.
- b. Test Theory. We assume a mechanical sampler examined visually and functioning properly will obtain a representative sample. Therefore, the test is not really an accuracy test for the sampler, but a performance test of the entire mechanical sampling *system* together with the material handling *system*. The test shows:
 - (1) Is there grain breakage after the sampler location, as it passes through scales, garners, or bins?
 - (2) What is the quantity of sample obtained?
 - (3) Does the sampler cut the entire grain stream?
 - (4) Is the grain flow past the sampler smooth?
 - (5) Does the secondary back up at the required timer setting?
 - (6) Is pressure venting adequate for spouting?
 - (7) Is dust collection needed, and is air flow properly balanced?

⁴ By visually checking the condition of various aspects of the system.

⁵ By comparing samples drawn by the mechanical sampling system to samples drawn from the same lot(s) by a "standard" system.

- c. Initial Test. Examine and test sampling systems before issuing a Form FGIS-980, "Authorization to Use Mechanical Sampler for Sampling." Sample five test lots of the commodity(ies) using the sampling system and using the standard sampling method. When possible, test systems *as used*. Evaluate the different flow rates, belt angles, belt speeds, bins, and other variable features of the grain handling system and, if necessary, do grain comparison tests to ensure that the system is accurate when various features are used.

(1) Group 1 and 2 Approval.

- (a) Unlimited Approval. The sampling system may be authorized for all commodities in groups 1 and 2 (See Table III.) without further testing, if satisfactory results are obtained by testing the system with corn. Use corn containing a maximum 15.5 percent moisture and from 2.0 to 5.0 percent broken corn and foreign material (BCFM) for testing purposes. FGIS field office managers have the authority to allow more or less BCFM in the test lots, for good reason only, documented on the test form.
- (b) Limited Approval. If unlimited approval is not needed, the system may be authorized for either group 1 and/or group 2 commodities, except corn, by obtaining satisfactory results with one grain in each group:
- 1) Use a commodity containing a machine-separable factor such as, thin kernels, shrunken and broken kernels, broken kernels (milled rice or brown rice for processing), foreign material, or dockage in quantities more than 0.5 percent for testing the system, and
 - 2) If, at a later date, corn becomes available and will be offered for inspection, test the sampling system using corn before it is authorized to sample corn.

- (2) Group 3 approval is handled on a case-by-case basis, but normally does not require testing, only an examination.

Table III, Commodity Groups

Group 1 Small Commodities		Group 2 Coarse Commodities	Group 3 Powders
Barley	Wheat	Soybeans	Flour
Flaxseed	Rice	Corn	Corn Meal
Rye	Lentils	Peas	Soybean Meal
Sorghum	Bulgur	Edible Beans	Other Meals
Oats	Rolled Oats	Sunflower Seed	Powdered Milk
Canola	Minor Oilseeds		Corn Soy Blend

- d. Periodic Tests. There is no requirement to test diverter-type samplers with grain on a periodic basis.
- e. Supplemental Tests. Supplemental tests are required based on the same criteria for questioning system accuracy as in Chapter 4 instructions covering supplemental examinations, Page 4-3.
- f. Test Procedures—Diverter-Type Samplers.
 - (1) Outbound Movement Systems
 - (a) All Facilities. Test sampling systems used for securing official samples of outbound commodities with a pelican sampler at the end of the loading spout. At the discretion of the testing office, use a loading spout other than the normal spout if the additional routing does not increase or decrease breakage and is more feasible. The testing office may also consider using a sampling method other than the pelican at the end of the loading spout if they decide that a representative sample cannot be obtained with the pelican or using the pelican causes a safety problem. Consider the alternatives in this order:

- 1) Use of a "standard" diverter-type (primary) sampler. Except as noted on the authorization, use this standard only to test other diverter-type systems.
 - 2) Ellis cup sampling as close as possible to the end of the system (carrier).
 - 3) Comparison of the system in question with an authorized (tested) diverter-type sampling system at either origin or destination.
- (b) Shipping Bin Houses. Physically verify the shipping bins are clean before and after testing. Run the test lot(s) into a closed shipping bin(s) at the facility's normal loading rate. When the entire test lot is in the shipping bin, open the bin slide to provide a maximum flow of 15,000 bushels per hour. Take the standard sample after the grain has left the bin. A test lot should consist of a complete bin. At the discretion of the testing office, a test lot may be composed of a part bin of one normal component sample; however, the reasons for the variance shall be substantial and must be documented on the test form.
- (c) Direct Load Houses.
- 1) Facilities not using shipping bins must discharge the test lots at a maximum flow rate of 15,000 bushels per hour so the sample may be obtained at the end of the loading spout with the pelican sampler. When reduced flow rates are required to accomplish the testing, observe the system during operation at the facility's normal flow rate to see if it is accepting all the commodity.
 - 2) A test lot should be at least equal to one subplot, but may, at the discretion of the testing office, be equal to one component sample; however, the reasons for the variance shall be substantial and must be documented on the test form.

- 3) At facilities where the commodity is loaded directly through bins without holding for grading, the commodity sometimes breaks up, causing the mechanical sampling system results to disagree with the standard results. If this occurs, a cushion of sufficient depth shall be maintained whenever the system is tested or being used. (Note this fact on the Form FGIS-980 and the sample collection container.) In order for official inspection personnel to ensure that the cushion is present during loading, facilities shall install a continuous bin depth indicator system where inspection personnel are located.

(2) Inbound Movement Systems.

- (a) Test sampling systems installed to secure official samples of inbound commodities using the pelican or Ellis cup samplers. Obtain test samples before the initial elevation or immediately afterward, if necessary.
- (b) Facility management must control the flow rate of the test lots to ease pelican or Ellis cup sampling. Where reduced flow rates are required to accomplish the testing, observe the sampler at the facility's normal flow rate to see if the sampler is accepting all the commodity.

g. Analyzing Test Results and Completing the Test Form for Diverter-Type Samplers.

- (1) Determination of Factor Results. Analyze the samples drawn from the test lots for the appropriate machine-separable factor but do not hand adjust for cobs, for pieces of foreign material, etc. Record the factor results on the reverse of Form FGIS-936, "Sampler Condition Report" (Figure 9) and compare the factor averages. Percentages should be rounded to 2 decimal places.

- (2) Determine whether the system is within the allowable tolerance of ± 10 percent of the standard result mean and notify the facility management of the test results. Do not issue a certificate.
- (3) For out-of-tolerance equipment, document all pertinent facts and action taken on the Form FGIS-936. This includes adjustments, retests, and follow-up action.
- (4) File the original Form FGIS-936 after all tests are completed and the results recorded. Do not send copies of the form to FGIS Headquarters.
- (5) If the tests are done by an official agency for initial authorization of the system, send the Form FGIS-936 to the FGIS field office for review. The FGIS field office must review the results and, if they are within acceptable limits, authorize the sampling system for use in obtaining samples of commodities for official inspection purposes.

MECHANICAL SAMPLING SYSTEMS HANDBOOK

Chapter 5

Public reporting burden for this collection of information is estimated to average .75 hrs. per response and .04 hrs. per recordkeeper, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the form. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to USDA, OIRM, Clearance Officer, AG, Box 7630, Washington, DC 20250-7630, and to the Office of Management and Budget, Paper Reduction Project, Washington, DC 20503. When replying refer to the OMB Number and Form Number in your letter.

CHECKTESTING

METHODS USED: ☐ PELICAN **A** ☐ PROBE ☐ CUP ☐ OTHER (Specify) _____

COMMODITY: ☐ SMALL GRAIN **B** ☐ COARSE GRAIN ☐ OTHER (Specify) _____

FACTORS TESTED: ☐ DOCKAGE ☐ FOREIGN MATERIAL OR BROKEN CORN AND FOREIGN MATERIAL ☐ OTHER (Specify) **C** **D**

NO OF LOTS TESTED _____

REMARKS (CONT.)

E

CHECKTEST RESULTS

DATE	SAMPLE NO.	TYPE OF SAMPLER	DKG	SHBN	BCFM	FA	THIN	BKFM	TW				
F	1	MECH.											
		STD.											
	2	MECH.											
		STD.											
	3	MECH.											
		STD.											
	4	MECH.											
		STD.											
	5	MECH.											
		STD.											
AVERAGE		MECH.											
		STD.											
MEAN DEVIATION FROM STANDARD													
ALLOWABLE DEVIATION													
FACTOR TESTED													
WITHIN TOLERANCE			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCEEDS TOLERANCE			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FORM FGIS-936 (3-94)

K

Figure 9, FORM FGIS-936, "SAMPLER CONDITION REPORT," (REVERSE)

INSTRUCTIONS FOR COMPLETING
FORM FGIS-936, "SAMPLER CONDITION REPORT,"
(REVERSE)

Use the reverse of Form FGIS-936 for testing (grain test). Always precede a test with an examination, documented on the front of the form. If the examination and the test are not recorded on the same sheet, properly identify the test by filling in the Name of Elevator, etc., Items 1 through 11 and 32 through 34 on the front as described in Chapter 4, Examinations.

- A. Method of sampling—What was the standard? If a special location or procedure was used, explain in remarks.
- B. Specify grain.
- C. Specify factor.
- D. Enter 1 or 5 test lots.
- E. Remarks—Summary of important observations on the sampling system and testing information. Was the test run at normal load-out speed, air pressure, belt depth, etc.? Was dust collection turned on? Shipping bins checked?
- F. Enter date sampled.
- G. One factor is required, but additional factors may be tested. If necessary, the field office manager shall decide the appropriate factors. Test weight is not to be used as the only factor. Report percentages to 2 decimal places.
- H. Mathematical average of the mechanical sampler results, average of the standard results, average of other results. Round percentages to 2 places.
- I. Mean deviation = (standard average) – (mechanical average).
- J. Allowable deviation = $0.10 \times$ (standard average).
- K. Mark the appropriate box for each factor tested. If more than one factor was tested, each of them must be within tolerance for a pass. A factor is considered within tolerance when the mean deviation from the standard is less than or equal to the allowable deviation for the applicable factor(s).

5.2 PROBE-TYPE SAMPLER TESTS.

- a. A probe-type sampling system (mechanical truck probe) test requires the sampling of 20 bobtail (farm) or other trucks by:
 - (1) Hand probe (trier).
 - (2) Mechanical truck probe.
 - (3) Pelican sampler.
- b. Examine and retest a mechanical truck probe at least each 12 months (ten test lots). Calculate the period starting from the first day of the next calendar month after the examination and test.
- c. The pelican sampler results serve as the standard results for the approval. In the event that a representative pelican sample cannot be obtained, the testing office may use an Ellis cup or a diverter-type sampler. The basis for the decision should be documented on the Form FGIS-936.
- d. The probe may be authorized for all commodities in groups 1 and 2 without further testing, if satisfactory results are obtained by testing the probe with corn. If unlimited approval is not needed, the probe may be authorized for either group 1 and/or group 2 commodities, except corn, by obtaining satisfactory results with one grain in each group. Make every effort to select test lots of corn with a wide range of test weight per bushel (TW) and broken corn and foreign material (BCFM) from the truck lots available at the testing site. For other grains, use TW and a machine-separable factor such as:
 - (1) Flaxseed —Dockage.
 - (2) Sorghum —Broken kernels and foreign material.
 - (3) Soybeans —Foreign material.
 - (4) Sunflower seed —Machine separated FM.
 - (5) Rough rice —Total rice, whole kernels, dockage, no TW.
- e. For either outbound or inbound trucklots, use a hand trier of approximately the same length as the mechanical probe and in the same sampling pattern normally used for official sampling to draw the trier sample. Usually this will be the 7-probe truck pattern.

- f. Pelican sampling will employ tailgate sampling of the grain while the grain is being discharged into the truck pit. Any type of truck is acceptable, as long as the flow of grain can be controlled so a representative cut can be taken with the pelican. Exercise care in pelican sampling to ensure that the pelican does not fill and overflow before the grain stream is traversed. This can best be accomplished by restricting the flow of the grain from each truck. Restrict grain flow so a minimum of 10 pelican samples can be drawn, at regular intervals, from each load before the truck empties.
- g. Officially inspect all samples for the necessary factors, retaining file samples until the approval process is completed. For corn BCFM, combine machine and handpicked portions.
- h. Analyzing Test Results and Completing the Test Form for Probe Systems.
 - (1) Factor Results. Record the factor results on the reverse of Form FGIS-936, "Sampler Condition Report," but do not compare the factor averages directly. Instead, we test to see that the mechanical probe does not deviate from the pelican to a greater extent (absolute value) than the hand trier deviates from the pelican. To accomplish this, QARD analyzes the data using a t-test or regression analysis.
 - (2) Out-of-Tolerance Equipment. For out-of-tolerance equipment, document all pertinent facts and action taken on the Form FGIS-936. This includes adjustments, retests, and follow-up action.

5.3 TEST OR EXAMINATION FAILURE.

- a. General. The best time to test a sampler is *as used* during normal loading or unloading operations. To encourage as used testing at export locations, the following procedures assure facilities that there will be no unwarranted qualifying statements on the official certificate.
- b. Export Grain Loading Situation. If a mechanical sampling system fails a test and/or examination during the sampling of an export cargo grain shipment and there is no alternate diverter-type sampling system available, sample the remainder of the shipment using either a pelican or Ellis cup sampler. Use the sample obtained by the alternate method for official purposes, not the sample obtained by the failed system.
 - (1) The FGIS field office will suspend authorization of the sampler, in writing, if the problem will not be corrected immediately.

- (2) Whatever the amount of grain to be loaded or the time it takes to complete loading, do not show a special statement on the inspection certificate of the shipment being loaded at the time of the failure.
- c. On all future shipments, until the diverter-type mechanical sampler passes a test, the following special statement (See Section 800.83(e)(3) of the regulations under the U.S. Grain Standards Act, as amended.) must appear on the official inspection certificates issued: "The lot of grain represented by this certificate was sampled by means of (type of sampling method). Samples obtained by this method may not be as representative as those obtained by approved diverter-type mechanical sampler." (However, if the diverter-type sampling system passes a retest during the loading of the shipment and at least 50 percent of the entire shipment was sampled by the diverter-type sampler, do not require the statement on the official certificate representing that shipment.)
- d. Domestic Grain Loading Situation. If a diverter-type mechanical sampling system fails a test or examination during the sampling of a domestic lot of grain, stop using the sampler and implement an alternate sampling method. Show the actual sampling method(s) used on the inspection certificate regardless of the amount of time or volume of grain loaded using the alternate method. No special statement is required.

5.4 REINSTATEMENT.

To reinstate the authorization of a sampling system that fails an examination or test, the applicant must furnish data or make adjustments that suggest the system(s) will pass a succeeding examination and test. If the system fails a test, the succeeding test(s) must consist of five test lots preceded by a complete examination, the same as required for an initial authorization. If the system fails an examination, the system must be completely reexamined and, at the discretion of the testing office, the system may be retested with either one or five test lots.

Reserved

Chapter 6

MAINTENANCE, REPAIR, AND ALTERATION

6.1 MAINTENANCE.

- a. General. The facility management shall install and maintain each mechanical sampling system according to the guidelines established by FGIS and the manufacturer of the equipment used in the system.
- b. Official personnel are not responsible for preventive maintenance inspections.
- c. Facility personnel must perform preventive maintenance inspections and service on mechanical sampling systems regularly.
- d. Repeated incidence of failure to perform maintenance of the mechanical sampling system or the material load-out system will result in an increased frequency of supplemental examinations and supplemental tests.

6.2 REPAIR.

- a. General. Mechanical sampling systems must be repaired as necessary in a timely manner and according to the manufacturer's guidelines.
- b. Suspension of Authorization. FGIS will suspend authorization of sampling systems that do not or cannot function properly until appropriate repairs are made and the accuracy of the sampler is confirmed by the testing office. If the testing office decides the repairs are sufficiently extensive, the sampling system must be tested on five test lots before the authorization is released. Replacing a minor part usually requires only an examination before releasing the authorization.

c. Sampler Breakdowns.

(1) Export Grain Loading Situation (Diverter-Type Sampling System Only)

(a) If a diverter-type sampling system breaks down during the sampling of an export cargo grain shipment and there is no alternate diverter-type sampling system available, sample the remainder of the shipment using either a pelican or Ellis cup sampler. The following special statement (See Section 800.83(e)(3) of the Regulations under the U.S. Grain Standards Act, as amended.) must appear on the official inspection certificate: "The lot of grain represented by this certificate was sampled by means of (type of sampling method). Samples obtained by this method may not be as representative as those obtained by approved diverter-type mechanical samplers."

(b) However, the statement is not required if:

- 1) At least 50 percent of the entire lot was sampled by the diverter-type sampling system, and
- 2) The loading of the lot is completed within 8 working hours using the alternate sampling method.

(2) Domestic Grain Loading Situation. If a diverter-type sampling system breaks during the sampling of a domestic lot of grain, show the actual sampling method(s) used on the inspection certificate regardless of time used or volume of grain loaded under the alternate method. No special statement is required, under any circumstances.

6.3 ALTERATION.

- a. General. When alteration work begins, suspend the authorization of the affected sampling system until the alteration is completed and the system is retested and approved on five test lots. A minor alteration usually requires only an examination before reinstating the authorization.
- b. Temporary Pelican Modification (Diverter-Type Sampling System Only). The primary sampler's pelican may be temporarily modified to sample meal without affecting the authorization of the sampler, if one of the following methods is used and the pelican is returned to its proper configuration before being used to sample whole kernel commodities. The approved modification methods are:

- (1) Inserting a block of wood or similar material in the opening of the pelican;
- (2) Adjusting the air pressure or speed control valve; and
- (3) Adjusting the cutting edge of the pelican.